## What is claimed is:

- 1. An apparatus for monitoring integrity of a wire, comprising:
- a pulse generator for generating a pulse waveform for transmission through the wire:
- a function generator for generating a forcing waveform for transmission through the wire, wherein the pulse waveform is transmitted through the wire in combination with the forcing waveforms; and
- a detector adapted to measure the change in dissipation factor values along the wire.
- 2. An apparatus according to Claim 1, further comprising a coupling circuit arranged between the pulse generator and the wire.
- 3. An apparatus according to Claim 2, wherein the coupling circuit comprises a high pass filter to isolate the pulse generator from the forcing waveform.
- 4. An apparatus according to Claim 1, wherein the forcing waveform is at a predetermined frequency in accordance with a type of wire insulation material and/or a type of wire conductor material.
- 5. An apparatus according to Claim 1, further comprising a digital multimeter for measuring a voltage induced in the wire.
- 6. An apparatus according to Claim 1, further comprising an impedance meter for measuring the dissipation factor values of the wire.
- 7. An apparatus according to Claim 1, wherein the function generator sweeps the forcing waveform between a frequency range of  $\omega_{\min}$  and  $\omega_{\max}$ , where  $\omega_{\text{peak}}$  is greater than  $\omega_{\min}$  and less than  $\omega_{\max}$ .

8. A method for monitoring integrity of a wire, comprising the steps of:
generating a pulse waveform for transmission through the wire;
generating a forcing waveform for transmission through the wire;
transmitting the pulse waveform through the wire in combination with the forcing waveform; and

measuring a change in dissipation factor values along the wire.

- 9. A method according to Claim 8, wherein the forcing waveform is at a predetermined frequency in accordance with a wire insulation material and/or a wire conductor material.
- 10. A method according to Claim 8, further comprising a step of measuring a reflected waveform from the transmitted pulse waveform.
- 11. A method according to Claim 8, further comprising a step of isolating the pulse waveform from the forcing waveform.
- 12. A method according to Claim 8, further comprising a step of sweeping the forcing waveform between a frequency range of  $\omega_{min}$  and  $\omega_{max}$ , where  $\omega_{peak}$  is greater than  $\omega_{min}$  and less than  $\omega_{max}$ .
- 13. An apparatus for monitoring integrity of a wire, comprising: a pulse generator for generating a pulse waveform for transmission through the wire;
- a generator for generating a non-electrical forcing function for stimulating the wire, wherein the pulse waveform is transmitted through the wire in combination with the non-electrical forcing function; and
- a detector adapted to measure the change in dissipation factor values along the wire.

- 14. An apparatus according to Claim 13, further comprising a coupling circuit arranged between the pulse generator and the wire.
- 15. An apparatus according to Claim 14, wherein the coupling circuit comprises a high pass filter to isolate the pulse generator from the forcing waveform.
- 16. An apparatus according to Claim 13, wherein the generator is a heat generator and wherein the non-electrical forcing function is a thermal forcing function.
- 17. An apparatus according to Claim 16, wherein the thermal forcing function is at a predetermined temperature accordance with a type of wire insulation material and/or a type of wire conductor material.
- 18. An apparatus according to Claim 16, wherein the heat generator sweeps the thermal forcing function between a temperature range of  $T_{min}$  and  $T_{max}$ , where  $T_{peak}$  is greater than  $T_{min}$  and less than  $T_{max}$ .
- 19. An apparatus according to Claim 13, wherein the generator is a vibration generator and wherein the non-electrical forcing function is a mechanical forcing function.
- 20. An apparatus according to Claim 19, wherein the mechanical forcing function is at a predetermined vibration in accordance with a type of wire insulation material and/or a type of wire conductor material.
- 21. An apparatus according to Claim 19, wherein the vibration generator sweeps the mechanical forcing function between a frequency range of  $\omega_{min}$  and  $\omega_{max}$ , where  $\omega_{peak}$  is greater than  $\omega_{min}$  and less than  $\omega_{max}$ .

- 22. An apparatus according to Claim 13, further comprising a digital multimeter for measuring a voltage induced in the wire.
- 23. An apparatus according to Claim 13, further comprising an impedance meter for measuring the dissipation factor values of the wire.
- 24. A method for monitoring integrity of a wire, comprising the steps of: generating a pulse waveform for transmission through the wire; generating a non-electrical forcing waveform for stimulating the wire; transmitting the pulse waveform through the wire in combination with the non-electrical forcing waveform; and
- 25. A method according to Claim 24, wherein the non-electrical forcing function is a thermal forcing function.

measuring a change in dissipation factor values along the wire.

- 26. A method according to Claim 25, wherein the thermal forcing function is at a predetermined temperature in accordance with a type of wire insulation material and/or a type of wire conductor material.
- 27. A method according to Claim 25, further comprising a step of sweeping the thermal forcing function between a temperature range of  $T_{min}$  and  $T_{max}$ , where  $T_{peak}$  is greater than  $T_{min}$  and less than  $T_{max}$ .
- 28. A method according to Claim 24, wherein the non-electrical forcing function is a mechanical forcing function.
- 29. A method according to Claim 28, wherein the mechanical forcing function is at a predetermined vibration frequency in accordance with a type of wire insulation material and/or a type of wire conductor material.

- 30. A method according to Claim 28, further comprising a step of sweeping the mechanical forcing function between a frequency range of  $\omega_{min}$  and  $\omega_{max}$ , where  $\omega_{peak}$  is greater than  $\omega_{min}$  and less than  $\omega_{max}$ .
- 31. A method according to Claim 24, further comprising the step of measuring a voltage induced in the wire.
- 32. A method according to Claim 24, further comprising a step of isolating the pulse waveform from the non-electrical forcing waveform.